

Amendments to the Claims

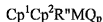
This listing of claims will replace all prior versions and listing of claims in this application.

Listing of claims:

What is claimed is:

Claims 1-21 (Cancelled)

22. (Currently Amended) A olefin polymerization catalyst composition comprising a metallocene catalyst component characterized by the formula:



wherein:

(a) Cp^1 and Cp^2 are each independently a substituted or unsubstituted ~~cyclopentadienyl derivative incorporating a cyclopentadienyl ring in the form of a substituted or unsubstituted~~ cyclopentadienyl group, a substituted or unsubstituted indenyl group or a substituted or unsubstituted fluorenyl group wherein at least one of the ~~cyclopentadienyl derivatives~~ Cp^1 and Cp^2 incorporates a nitrogen (N) or phosphorus (P) atom in its cyclopentadienyl ring, and wherein at least one of Cp^1 and Cp^2 is a substituted or unsubstituted fluorenyl group;

(b) R^n is a structural bridge between Cp^1 and Cp^2 imparting stereorigidity to the ligand structure provided that when Cp^1 incorporates a phosphorus atom in its cyclopentadienyl ring and Cp^2 is free of a phosphorus atom in its cyclopentadienyl ring, the bridge R^n is connected to the phosphorus atom in Cp^1 or to a carbon atom in Cp^1 which is distal to the phosphorus atom ~~and further provided that when Cp^1 is a substituted or unsubstituted~~

indenyl group and Cp^2 is a substituted or unsubstituted indenyl group, the bridge R'' is connected to the nitrogen atom of group Cp^2 or to a carbon atom which is vicinal to the nitrogen atom;

(c) M is a transition metal from Group IIIB, Group IVB, Group VB or Group VIB of the Periodic Table of Elements (CAS Version);

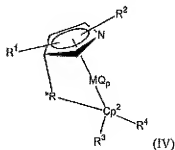
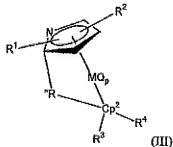
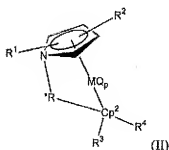
(d) Q is a halogen or a hydrocarbyl group having from 1-20 carbon atoms; and

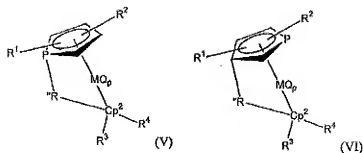
(e) p is equal to the valence of the transition metal M minus 2.

23. **(Previously Presented)** The composition of claim 22 wherein one of Cp^1 or Cp^2 incorporates a nitrogen atom in its cyclopentadienyl ring, and R'' is attached to the nitrogen atom, to a carbon atom vicinal to the nitrogen atom, or to a carbon atom non-vicinal to the nitrogen atom.

24. **(Currently Amended)** The composition of claim 22 in which Cp^1 and Cp^2 are each independently ~~a substituted or unsubstituted cyclopentadienyl group, or~~ a substituted or unsubstituted fluorenyl group, wherein at least one of Cp^1 and Cp^2 incorporate a nitrogen (N) or phosphorus (P) atom in its cyclopentadienyl ring.

25. **(Previously Presented)** The composition of claim 22 wherein the catalyst component is characterized by one of the following formulas (II) – (VI):





wherein R^1 , R^2 , R^3 and R^4 may be the same or different and are selected from the group consisting of a halogen and $C_1 - C_{20}$ alkyl, aryl, cycloalkyl, alkoxy and silanyl groups.

26. **(Previously Presented)** The composition of claim 22 wherein Cp^1 is a substituted or unsubstituted cyclopentadienyl group and Cp^2 is a substituted or unsubstituted fluorenyl group, wherein at least one of Cp^1 and Cp^2 incorporate a nitrogen (N) or phosphorus (P) atom in its cyclopentadienyl ring.

27. **(Canceled)**

28. **(Previously Presented)** The composition of claim 22 wherein M is Ti, Zr, Hf, or V.

29. **(Previously Presented)** The composition of claim 28 wherein p is 2.

30. **(Previously Presented)** The composition of claim 29 wherein Q is Cl.

31. **(Previously Presented)** The composition of claim 22 wherein R'' is substituted or unsubstituted and is selected from the group consisting of an alkylidene group having from 1-20 carbon atoms, a dialkyl germanium group, a dialkyl silicon group, a dialkyl siloxane group, an alkyl phosphine group and an amine group.

32. **(Previously Presented)** The catalyst of claim 31 wherein R'' comprises an Me_2Si group or an Et group.

33. **(Currently Amended)** The catalyst of claim 22 wherein at least one of the Cp^1 and Cp^2 derivatives are substituted with substituents which are independently selected from the group consisting of aryl groups having from 1-20 carbon atoms, hydrocarbyl groups having from 1-20 carbon atoms, cycloalkyls, silane derivatives, alkoxies and halogens.

34. **(Previously Presented)** The composition of claim 33 wherein said substituents are independently selected from the group consisting of Ph, Bz, Naph, Ind, BzInd, Me, Et, n-Pr, i-Pr, n-Bu, and Me_3Si .

35. **(Previously Presented)** The composition of claim 34 wherein the substituents are methyl groups.

36. **(Previously Presented)** The composition of claim 22 wherein the metallocene catalyst component is immobilized on a solid support.

37. **(Previously Presented)** The composition of claim 22 further comprising an aluminum- or boron-containing co-catalyst capable of activating the catalyst component.

38. **(Previously Presented)** The composition of claim 22 wherein Cp^1 incorporates a nitrogen or phosphorus atom and is a cyclopentadienyl group or an indenyl group which is substituted or unsubstituted and Cp^2 is a substituted or unsubstituted fluorenyl group.

39. **(Previously Presented)** The composition of claim 38 wherein Cp^1 is a substituted or unsubstituted cyclopentadienyl group and Cp^2 is a fluorenyl group with at least one substituent at the 3- or 6-position, or at the 2- or 7-position, wherein Cp^1 incorporates a nitrogen (N) or phosphorus (P) atom.

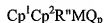
40. (Previously Presented) The composition of claim 39 wherein said fluorenyl group is disubstituted with substituents at the 3- and 6-positions or at the 2- and 7-positions.

41. (Previously Presented) The composition of claim 40 wherein said substituents are methyl groups.

42. (Previously Presented) The composition of claim 22 wherein said catalyst component is selected from the group consisting of: $\text{Me}_2\text{Si}(\text{pyrrolyl})\text{FluZrCl}_2$, $\text{Et}(\text{pyrrolyl})\text{FluZrCl}_2$, $\text{Me}_2\text{Si}(\text{imidazolyl})\text{FluZrCl}_2$, $\text{Et}(\text{imidazolyl})\text{FluZrCl}_2$, $\text{Me}_2\text{Si}(\text{phospholyl})\text{FluZrCl}_2$, and $\text{Et}(\text{phospholyl})\text{FluZrCl}_2$.

43. (Currently Amended) A process for the polymerization of an ethylenically unsaturated monomer comprising:

- (a) providing a metallocene catalyst component characterized by the formula:



wherein:

(i) Cp^1 and Cp^2 are each independently a substituted or unsubstituted cyclopentadienyl derivative incorporating a cyclopentadienyl ring in the form of a substituted or unsubstituted cyclopentadienyl group, a substituted or unsubstituted indenyl group or a substituted or unsubstituted fluorenyl group wherein at least one of the cyclopentadienyl derivatives— Cp^1 and Cp^2 incorporates a nitrogen (N) or phosphorus (P) atom in its cyclopentadienyl ring, and wherein at least one of Cp^1 and Cp^2 is a substituted or unsubstituted fluorenyl group;

(ii) R^n is a structural bridge between Cp^1 and Cp^2 imparting stereorigidity to the ligand structure provided that when Cp^1 incorporates a phosphorus atom in

its cyclopentadienyl ring and Cp^2 is free of a phosphorus atom in its cyclopentadienyl ring, the bridge R'' is connected to the phosphorus atom in Cp^1 or to a carbon atom in Cp^1 which is distal to the phosphorus atom and further provided that when Cp^1 is a substituted or unsubstituted indenyl group and Cp^2 is a substituted or unsubstituted indolyl group, the bridge R'' is connected to the nitrogen atom of group Cp^2 or to a carbon atom which is vicinal to the nitrogen atom;

(iii) M is a transition metal from Group IIIB, Group IVB, Group VB or Group VIB of the Periodic Table of Elements (CAS Version);

(iv) Q is a halogen or a hydrocarbyl group having from 1-20 carbon atoms; and

(v) p is equal to the valence of the transition metal M minus 2;

(b) providing an activating co-catalyst component;

(c) contacting said metallocene catalyst component and said activating co-catalyst component in a polymerization reaction zone with an ethylenically unsaturated monomer to produce a polymer product by the polymerization of said monomer; and

(d) recovering said polymer product from said reaction zone.

44. (Previously Presented) The method of claim 43 wherein said ethylenically unsaturated monomer is ethylene or propylene.

45. (Previously Presented) The method of claim 44 wherein said monomer comprises propylene and said polymer product is a polypropylene homopolymer or copolymer.

46. (Canceled)